SAN BERNARDINO MICROWAVE SOCIETY, Incorporated

FOUNDED IN 1955

A NON-PROFIT AMATEUR TECHNICAL ORGANIZATION DEDICATED TO THE ADVANCEMENT OF COMMUNICATIONS ABOVE 1000 MC.

W6IFE Newsletter

December 2006 Edition

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At the **7 December 2006** meeting is Chris, N9RIN showing PCB layout and manufacturing techniques The SBMS meets at the American Legion Hall 1024 Main Street (south of the 91 freeway) in Corona, CA at 1900 hours local time on the first Thursday of each month. Check out the SBMS web site at http://www.ham-radio.com/sbms/.

Ed Jones, our November speaker asked us to put his web site in the newsletter. It is www.ecjones.org and has lots of interesting stuff about radio propagation and other topics.

REMINDER- NO PARKING IN THE CHURCH LOT UNTIL CLAIRIFICATION IS MADE.

Last meeting-Ed Jones provided an interesting talk on HF propagation that he has conducted using digital packet modes to time the delay between transmit and reception of a return from a digipeater cross county. Interesting delays pointed to the daily changes in ionization layers and polar magnetic events. Check out his web site noted above. Dave announced his annual Christmas party at the "LAB", see announcement in this issue. 26 people present.

Scheduling.
January 2007 is still in the works.

Activity reported at the 2 November SBMS meeting-, Mel, WA6JBD worked on Cactus radios for microwave links; John, KJ6HZ help K6JEY tune up his amplifier; Dave WA6CGR built a 47 GHz radio; Larry, K6HLH worked home to home with WA6EXV with his 4 ft dish and 10w on 10 GHz over two sets of mountains, and

attended MUD 06; Pat, N6RMJ modified an FT817 and has power in the back of his truck for microwave- 1v drop over 15 ft at 15 amps; Juno, KG6MQS, has been working on 10 and 24 GHz rigs; Chip, N6CA has been 24, 47, 78 GHz stuff off ebay and has 900 MHz repeater up on Sunset; Mike, W6YLZ indicated that Bernardo made 160K point in the contest; Dave, N6TEB has been collecting 24 GHz parts and making a 10 GHZ ATV omni antenna; Rent, K6WCI has been collecting 10 GHz parts; Bob WA6VHS has been wiring his 47 GHz rig and collecting 78 GHz parts; Chris, N9RIN worked on his PLL board; Ray WA6OWM has been working rain scatter; Jeff, KN6VR worked on his 1296 MHz amplifier; Bill, WA6QYR checked out his RDR electronics 3 w 10 GHz amplifiers; Chuck, WA6EXV worked on his N1JEZ GPS standard; Dick, WB6DNX did some Qualcomm DRO board work and rebuilt his 10 GHz radio; Dennis, W6DQ taught a Tech license class of 18 and had 17 pass.

Hello Everyone,
Well, it's that time of the year again when we get together for the **4th Annual SBMS Christmas** on Saturday, December 9, 2006 at the Lab in Wilmington. The official party times are from 12:00 P.M. to 4:00 P.M. and is a Pot Luck. Once again, kudos to Pat - N6RMJ and Wayne - KH6WZ for all of their work helping to clean up the Lab last weekend getting ready for the party!!
Because the party is a pot-luck and was so successful in past years, if you want to bring the same type of dish that you brought last time - that's OK! But please let me know IN ADVANCE what you will be bringing, so when someone says, "what should I bring?" I will have a reasonable answer. Chairs - Tables - The Lab has a permanent set! We will have another great raffle with tickets for donation all day at the party. The Pastor will let us use the parking lot to the south of the shop. (We have to provide insurance this year (Who handles this??) and we will send them a small donation for their youth group from the raffle prizes).
Remember we will be having a gift exchange - If you bring a gift you will get a gift. THERE WILL BE A SEPARATE GIFT EXCHANGE FOR THE SPOUSES (or significant other). Last year we decided to make it approx. $10 value, but everyone brought better stuff so whatever you decide!
The Lab is located at: 1646 N. Wilmington Blvd. Wilmington, CA 90744 1-310-549-6622
Directions: Take the Harbor Freeway (110) South to Pacific Coast Highway. Turn left at the end of the off-ramp. The 2nd Signal light will be Wilmington Blvd. Turn left and go North about 3/4 mile and it is located on the right. We have permission to use the Church's South parking lot. If you are looking at the front door of the Lab, the parking lot is on your right, two doors down. It is NOT the parking lot adjacent to the Church!
We are looking forward to hosting the party and having a great time!
Thanks, Dave - WA6CGR

Off the web- thread 2C39 and 7289 microwave tube heat skink cap removal for water cooling---
For what its worth. On the ones with Allen screws in the side, I found an easy way to get them apart....
I use a razor saw from the hobby shop and score the aluminum halfway around and then grab it with pair of pliers (top to bottom of heat sink on one side) and have someone gently pull and twist the tube. It slides out without even using a vice.
[Fwd: Re: De-capping 2C39 or 3cx100's to add water jackets...]
Good point. Sometimes heat breaks down loctite.
Don't count on it in this case; after all, those tube coolers got pretty dang hot for hours on end while operating Loctite does have some web pages giving suggestions how to loosen/remove hardened Loctite, but you'll have to guess at which particular type was originally used on those tubes. Steve, K0XP
Hi Folks;
I am much more exotic regarding water-cooling Amplifier tubes. I simply accumulate water from the Dehumidifier into Plastic gallon container used to have 4 to 6 gallons around at any given time. I then place approx. 2 gallons at a time in a 5 gallon plastic bucket with a lid on it.
I use a "Little Giant" water pump to circulate it through the tubes (used to be 8 tubes, 2 X 4 Tuber), using completely ALL Neoprene tubing. For a cooler I drop two plastic Bread bags full of Ice Cubes made form the same high quality water in on top of all this sophistication and let her drift, or melt I guess is a better word, hi.
That would last for one complete EME Contest weekend, the next month I simply added Ice Cubes.
There is also a Bed involved, to prevent the water from forming algae I used that stuff you put in Water Bed's to prevent it from forming. Very Simple and never a problem, well almost never Regards, Darrell

At 05:32 PM 10/24/2006, Dr. Gerald N. Johnson wrote:
On Mon, 2006-10-23 at 10:52 -0400, Steven M. Simons wrote:> Some additional thoughts on water-cooling:
Use bottled distilled water - it is available at the food market in 1-gallon jugs.
City or well water can be used if it is free of contaminates - an in-line filter will remove the floating bad stuff.
You should provide some HV decoupling coils made of 1/4" diameter plastic tubing wound in 3>4" ID coils - perhaps 4 or 5 turns - exit these coils through a metallic bulkhead compression fitting on a grounded chassis wall - this will pro isolate the HV as well as providing a return to ground for the residual leakage current.
Good luck, Steve KF6AJ

It not the chunks that upset a water cooling system with high voltage on it so much as the dissolved stuff and most city or well water is quite conductive from dissolved iron, calcium, and chlorine. The conductivity isn't improved by softening processes either. Distilled is so cheap at the grocery or discount store that even thinking of washing the plumbing with the contaminated stuff that's considered drinkable is a step backwards. And when the water is conducting, it can be dissipating enough heat to take considerable capability away from the job at hand, cooling thetube.73, Jerry, K0CQ,

We used distilled water-cooling for our 20KW audio amplifiers when I worked at a test facility. The water was recirculated through a cooler/heat exchanger. A portion of the water was by passed through a small deionizer, which did an excellent job of keeping the water 'polished'. This continual by pass deionizing kept the water cleaner and of lower conductivity than when it was new. The deionizers were regular zeolite type, BUT were professionally regenerated using acid rather than salt.
Connections were made with nonconductive rubber hose. We tied reinforced vinyl, it softened and blew out. In small sizes it may be a good solution as there is proportionally more area for heat to be dissipated than our two-inch diameter hoses with a five horsepower pump. (The vinyl did last a couple of days before it blew and dumped a hundred gallons of distilled water all over the place)
Gene wa6yoj

On 10/24/06, Darrell <ve1alq@nbnet.nb.ca> wrote: Hi Folks; I am much more exotic regarding water-cooling Amplifier tubes. I simply accumulate water from the Dehumidifier into Plastic gallon containers...used to have 4 to 6 gallons around at any given time. I then place approx. 2 gallons at a time in a 5 gallon plastic bucket with a lid on it. I use a "Little Giant" water pump to circulate it through the tubes (used to be 8 tubes, 2 X 4 Tuber), using completely ALL Neoprene tubing. For a cooler I drop two plastic Bread bags full of Ice Cubes made form the same high quality water in on top of all this sophistication and let her drift, or melt I guess is a better word, hi.
That would last for one complete EME Contest weekend, the next month I simply added Ice Cubes.
There is also a Bed involved, to prevent the water from forming algae I used that stuff you put in Water Bed's to prevent it from forming. Very Simple and never a problem, well almost never Thanks Ed, distilled water as the coolant was my first choice.

Has anyone tried using one of the new PC liquid or phase vapor cooler systems on a 2C39 type amp? I was in Fry's and some of the offerings are high tech heat pipe devices or true phase vapor that might work pretty well.
Anyone play with these yet? Mike K9MK

Hi, All: I know this poor horse has been beaten to death, but, having built quite a number of water cooling systems for 7289's (and quite a few amplifiers to go with them), I have a couple of comments:
1) cheap distilled water works fine and lasts surprisingly long. Be sure to keep a micro ammeter to ground in the system. Put a copper nipple in the plastic water line, a foot or two from the tube. Connect to one side of the micro ammeter. Read the initial current, and then just keep an eye on it.
2) Never, never use an automotive heater core as a water cooler. They bleed lead (solder) into the water and foul it quickly. Use a cooler core with a continuous copper tube with fins. You can also use a spiral of copper tubing in front of a muffin fan.
3) Most readily available source of water pumps? Go to Wal*Mart and buy a12V bilge pump for a small boat. Cheap, variable speed (run from DC power supply), submersible. Just run it fast enough to keep the water flowing nicely. Keeps from blowing the hoses.
4) A cheap remote-sensor temperature gage with the probe sitting in the Tupperware water reservoir works fine, but most of them go out of range above 125F. Put a lid on the reservoir to keep dust and things out.
5) I made water-cooling caps for 7289's out of copper pipe caps. Drill the top for a pair of 1/4" copper tubes and

solder the tubes in place with lead-free silver solder or braze them on. I brazed them, but I have a torch. Instead of soldering the cap to the tube, slide the cap into the anode shell and use a bead of high-temperature RTV around the side. Works fine. If the water-cooling cap gets so hot the RTV fries, you've got other problems anyway.
6) I usually used food-grade plastic tubing with hose clamps to prevent the ends from coming off when the tubing gets warm. You can buy silicone tubing from McMaster-Carr. Better but more expensive.
7) I never did find a good, cheap, reliable flow indicator. Would be nice to have something with a nice, loud alarm to let you know when a hose blew off.
8) All the above worked on the Russian Gs9b's, except for those you make a whole anode bypass plate with water pot that bolts to the anode of the tube. Yeh, a lot more work. Those tubes were quite inefficient on 2304 and dissipated so much heat that unless you made the part that clamps to the tube anode really flat and used heat-transfer grease, they would turn the bare copper blue on top of the anode. I tried highly conductive silver paste (at $35 for a couple of grams!!) and it worked fine, but was a terrible nuisance to use. If you got even the tiniest smear on your bypass insulator, you would probably get one helluva short. Which, with a 2800 V, 800 mA power supply could be rather exciting. Thank heavens we now have solid-state.
Good luck! Ed

Dear Mike, ED, & The Microwavers, Has anyone ever applied water-cooling to a 2C39 tube without first removing the Anode Air-type heat radiator assembly? I'll admit that the resulting water-cooling jacket will be considerably larger in diameter. But, since that part of the tube is usually on the outside of the cavity resonator, this doesn't seem to be a big disadvantage.

The possible advantage to this approach is that new 2C39s can be tried in the circuit without having to go through the sometimes-difficult step of first removing the heat radiator. And, in the case of the types of radiators that are more difficult to remove, I'll bet quite a few 2C39s have become damaged in the past.

It is my belief that the thermal resistance within the Air-type radiator assembly is quite low. But, without the radiator, the water-contacting area at the Anode is quite small. Thus, care has to be exercised to insure that the proper amount of flowing water is directed at the hottest part of the anode to insure that local boiling does not decrease the desired heat transfer, and thus create a hot spot.

If the Air-type radiator is present, this requirement is eased, and it might even be possible to use a boiling-type of cooling. If boiling-type cooling was feasible, it might even be possible to eliminate the pump and the heat exchanger. Nothing more than a gravity-fed water supply reservoir would be needed.

Since boiling water will dissipate 540 kilocalories per gram, that's 8.55E6 joules per gallon. An amplifier that dissipates 400 watts key-down will consume one gallon of water in 5.9 hours of key-down time. A gallon of water might last through most of a weekend of an EME contest.

I'll admit I have never run a water-cooled 2C39 amplifier. Therefore, these comments might be very naive.

73 es Good UHF/SHF DX, Dick, K2RIW

Heat pipes are fine gadgets for moving heat from one spot to another. They work by boiling the fluid at the hot end, condensing it at the cool and moving the fluid back to thee cool end with a wick. That makes them transfer more heat per cross-section that solid copper. Several times the heat transfer rate off copper. They are limited by the volume of the liquid and the transfer rate of the wick to a maximum power input. When the wick can't get liquid to the hot end as fast as its been evaporated they can't move heat and the temperature of the hot end rises well above the boiling point of the fluid used. I've not researched liquid coolants lately, but the best I've heard of have no more than half the capacity of good old cheap plain distilled water. They may have better insulation properties or be less likely to corrode metals in the system but hardly are less toxic than water. And they make their vendors much money. Sometimes they have nicer boiling points than water that improve the operation or lifetime of the cooled object. Of course, one can raise the boiling point of water by pressurizing the cooling system, or lower it by evacuating the system to run at a partial vacuum though then the damages from leaks can become significant. A boiler with pressure is not a toy; it can be hazardous when it comes apart. All the water flashes to steam and goes everywhere, at a temperature that skin doesn't handle without great damage.73, Jerry, K0CQ,

My recently acquired DEMI 1296-144 3-watt transverter has opened up a new area of fun for me. While there are not many people active within easy tropo range of me, I have made a few nice contacts. It is obvious that I can hear better than I can be heard so I'm looking for more power.1296 is a new band for me so I'm not up to speed on what is available for power amps. Any recommendations would be appreciated. Several possibilities have occurred to me and I guess I'll jump on the first affordable solution that pops up.

The most useful would be a 12 volt powered solid-state amp. It would need a minimum of 10 dB gain, 3 watts in, at least 30 out. This solution would allow for easy portable/rover type operation. I have not seem anything that I could afford that runs on 12 volts so far.
Next I guess would be a 28-volt solid-state amp. This would probably limit its use to the home QTH but I can live with that. Again minimum of 3 watts in but would like to see 50 watts or so out. I've seen some 28-volt amps but none have met those specs or really appealed to me so far.
Last on my list is old technology tube type amps. This would definitely need to have more than 60 watts out for 3 watts in for me to consider. A single 2C39 type amp might be good but I haven't seen any for sale since I've been looking. Since I have been burned badly buying Russian tubes, I would prefer to stay away from those, especially since I have a bucket full of 2C39 type tubes! I probably could build a 2C39 amp, but I'm getting to the point where sheet metal work is not appealing to me any more. I've built three tube type amps for other bands this year and I'm tired of tin bending. Anybody have something for sale or a lead to one? Where might I look for one? The "usual places" have not turned up anything so far. Thanks & 73,Larry K6HLH

Message text written by INTERNET:k2riw@riwproducts.com
> has anyone ever applied water-cooling to a 2C39 tube without first removing the Anode Air-type heat radiator assembly? <
Dick: Yup, tried that, too. Mainly a physical problem, as I recall. I know I have one around somewhere, but darned if I can find it. I guess I've slept (and aged) in the past 15 years or so. Anyway, the anode cooler for the clamp-type tubes made you mount the water-cooling sleeve up high, since the clamp got in the way of the cooler. Long heat path. For the screw-type, I removed the cooler, turned the upper fins down a bit to allow water circulation, then RTVed a sleeve around the upper (turned down) fins, pressed (sealed) against the lowest fin that had been left full size (boy, I'll bet that sounds confusing). I drilled and tapped the top end of the original fins for a bolt, which held the cooler sleeve and top plate in place. Fins are aluminum; they don't solder very easily. It all worked, but was a heck of a lot more work than the pipe-cap water cooler. Also, since heat transfer problems are like strings of resistors, you still have the
interface between the tube anode extension and the aluminum fin center section, which has to transfer all the heat before it can be moved away by the water-cooling. That interface is like the problem I mentioned with theGs9bs..... Just not enough surface area with low enough thermal resistance to get the heat out of the tube fast enough. I have run across some early glass 2C39's that have thin copper finned coolers; they would probably be better candidates for this cooling scheme than aluminum ones. Haven't tried it. Probably won't. Drive on!
73,Ed K9EK EM69xd

On Wed, 2006-11-01 at 12:52 -0500, Tim (KE3HT) wrote:
I just saw an email about 1296 amps for automobile use and wanted to go into the Archives to read more about it. I need a password though. Not sure how I get a password? Anyone have a suggestion?
Thanks Tim KE3HT/r http://www.ke3ht.org ke3ht@ke3ht.org

Frank WB6CWN found this list on QRZ one day.
http://www.tech-systems-labs.com/
http://www.arireggioemilia.org/download/Manuali%20Radio/
http://www.wb4hfn.com/DRAKE/DrakeManuals.htm
http://www.hamdirectory.info/icom.html
http://www.smlec.com/ham/icom.htm
http://www.mods.dk/
http://petergottlieb.com/links.html
http://www.rigpix.com/schematicsnstuff.htm
http://www.cqham.ru/sch_eng.html
http://bama.sbc.edu/
http://www.cbtricks.com/
http://foxtango.ham-radio-op.net/
http://4dw.net/triplel/CBlinks/schematics.html <--GOOD ONE!
http://techpreservation.dyndns.org/schematics/
http://www.antiqueradioarchives.com/archives_index.htm
Barlow-Wadley http://koti.mbnet.fi/~ijl/

http://www.collinsradio.org/html/manuals.html
http://www.marcucci.it/english/download/index.htm
http://www.qsl.net/icom/
http://www.vmarsmanuals.co.uk/
http://www.qsl.net/n4xy/rcvr_national.html
http://www.hamanuals.com/miscmans.html
http://www.radiowrench.com/siltronix/
http://www.geocities.com/tmcvintage/index.html
http://www.transoceanic.nostalgiaair.org/
http://www.hamdirectory.info/schemari.html
http://www.qsl.net/kb7rgg/
http://victrolla.homeip.net/wo5s/junkpile/
http://www.eserviceinfo.com/
http://www.jamminpower.com/main/ba.jsp
http://www.ac6v.com/manuals.htm
http://www.geocities.com/kb8qfl/mods.html
http://www.usascan.com/files/manuals.html

Another thread JAN7609
Hi all Murphy struck Monday night in the middle of a good tropo opening. My 70cms Linear decided to commit hari kari:
So went to get a "allegedly " new 4CX250BM I'd purchased at a radio rally only to find the heater open circuit, not happy. I've been working my way through the old 4CX250Bs in the shack, none of
which are very useful, I found an Amperex JAN7609its the same shape as a 250B, but so are a lot of things! I've googled and found the odd reference to it but no data sheets. Has anyone got data on it, is it a 4CX250B, or a paperweight? Its not a quick job to change the valve in that amp, when I built it back in the late 70's,I should have put the access plate facing outwards. But alas its faces inwards, so it lift out the whole cavity and undo all the screws holding the side plate on, about an hour to do it. TIA & 73 Richard g8jvm

It's a 4X150D. Not ceramic but glass. 26.5-volt heater. If it has louvered fins, the plate dissipation is probably 250 watts, if straight fins, something less than 150 watts. In my Eimac Catalog 174 (or was that 175) it's shown as the same as a 4X150A/7034 except for the heater voltage. So in other eras it was the same as a 7035.
My google search turned up a few on ebay, claiming to be 4X150D and including sockets. Most links turned up sockets with lists of tubes they would hold.
-73, Jerry, K0CQ,

New Canadian record (Red Laser) VE2BP <-> VE2JWH
Lat 45° 21' 39.8" Long 72° 47' 58.0" to Lat 45° 21' 37.0" Long 72° 37' 49.6"
13.2 km 20h40 13 Nov 2006 local 01h40 14 Nov 2006 utc
73 de Pierre VE2PIJ FN35qi

Or just practice... it's around 8 miles (off the top of my head). For
something more exact, you can DIY
13.2/1.6093 = 8.2 miles.
1 mile = 1.6093km
and if you didn't know that, there's always http://www.onlineconversion.com another handy conversion factor is the definition of the nautical mile: 1 NM = 1 minute of latitude. This is real handy for maps which show lat/lon but with uncertain distance scales, e.g. Mercators. Also works for longitude at the equator - you can correct for any longitude by dividing by cos (longitude). Using this just off top of head, the path looks due E-W at 45N (cos (45) =0.7) and the latitudes were about 10 minutes apart. So it was about 7 NM.
Another quickie is 1 NM = 1 1/6 SM, and 1 SM = 1.6 km, so 1 NM = about1.8 km. Or you could go online; LCDR Data ...In any event, not too shabby for a visible light QSO, eh? Wonder what the rigs were? 73 de Mike W5VSI

Small point, the Nautical Mile WAS defined as one minute of latitude, but the advent of GPS and the irregular shape of the world has caused it to be redefined at 1852.0 metres or 1.150779statute mile. However, this does not distract

from the achievement, well done folk, and yes, what were the rigs like?
Geoff Blake G8GNZ located near Chelmsford, Essex, U.K.

Rolling your own microwave absorber

One way to make absorber material to line cavities with is to roll your on. The basic material is a rubberized plastic coating you get in a can from Home Depot. Find the insulating tool-handle dip coating.

1. Pour a cup or so of the material (usually red or yellow and very paint-looking) into a mixing can.
2. Combine carbon black (you can grind up charcoal briquettes if you're really desperate!) in and stir well.
3. You want to get as much carbon into the mixture as possible. You will probably be able to stir in 2-3 very heaping tablespoons of the stuff before it gets too thick to spread on. Thicken until it is putty-like.
4. Use a putty knife to apply the goo onto the surfaces to be treated, perhaps 0.05 to 0.1" thick.
5. Let it dry and check its effectiveness. For example, putting on a coated cover will have little detuning effect when the absorber is working properly.

Some 'sticky' points:

* you may get 3-7 dB of absorption of the RF after surface reflection. (Transmissive absorption may be double that for the same material.)
* You don't have to have perfect absorption in one reflection, and you will not get it, either! Waves in the cavity will make multiple bounces, and you are trying to get "fewest bounces for the buck".
* Roughness of the coated surface is usually a plus.
* Absorption is not flat over the 1-12 GHz band, and may vary from 3 dB at 1 GHz to 8 dB at 8 GHz and then return to 3- 4 dB at 12 GHz.
* Coating two orthogonal sides is better than coating one side.
* Coating an opposite side is better than coating just two orthogonal sides.
* Content of the mix has significant impact on absorption spectra. Using metallized carbon nanotubes is better than carbon black (but don't do this at home, and mix them only in a glove box). Metallic powders in carbon black can work very well, too. You're wanting depth conduction into the material where the energy is dissipated in resistive losses.
* Finally, the only way to fully absorb a wave front (and again, it is not really necessary) is to present a 377 Ohm match to the air. A continuous taper from 377 Ohms at the airside surface down to a 0-Ohmimpedance at the metallic surface is ideal. In short, that isn't gonna happen without multiple controlled layers, and it's not necessary.

Stir up some of this goo and try it. You will probably find that dabs here and there of your most crass-looking stuff will kill internal reflections sufficiently to make them a non-issue. It doesn't have to be perfect.
Thomas Visel, Nx1N

Compass rose for dish mounts---

On Sun, 2006-11-19 at 18:08 -0500, Gene Marks WB2LLP wrote: It is getting a bit cool here in the NE and time to build or rebuild for next spring. I have been looking a several pictures of 10GHz stations mounted on Surveyor tripods and there is something I cannot understand. It would appear that there is a circular piece of stock immediately above the tripod, which I would imagine is fastened to the tripod. Above this circular piece there is a protractor, which sticks out over the bottom piece. Above the protractor there is another piece of stock to which the actual equipment is fastened.

I assume that in the process of setting -up the station, the protractor is set to point north before the top piece is added. What I do not understand is how the protractor is kept from moving.

The remaining question is where did you get the large protractor? I have been unable to find one.

TNX es 73 de WB2LLP Gene

McMaster-Carr has them. 3" to 8", adhesive backed. www.mcmaster.com20045A31 through 20045A55. $7 to 12.
73, Jerry, K0CQ

Gene, You can also go to www.k5rmg.org.tech.html select Comp. Rose (compass rose) and print a scalable compass rose. If you print it on the Avery 8.5 x 11label paper (full sheet, to reduced cuts), you can stick it directly to a rigid backing. The center is located on the rose for you already. I also cover the top surface with a transparent shelf paper plastic sheet to protect the printed surface. You can get that stuff from house ware stores, Wall Mart, etc. By the way, this is also a good way to print and protect equipment panels for projects. The Roadrunners Microwave Group provides this link as a service to the microwave community.
There are now three different surveyor's tripods available to you. The oldest style has a 3-1/2 inch x 8-tpi thread

sticking up to which a transit leveling head is attached. The second has a flat top surface with a 2.75-inch hole with a little arm and stud underneath it which screws into the leveling head of a newer style transit with an optical plummet. The third tripod style has a flat top surface with a small hole of about 5/8 or3/4-inch in the center through which a theodolite tribrach is attached. The new aluminum tripods with extension legs and sharp points for planting in the ground sell from about $80 to $100. I saw such new tripods at Home Depot recently for about $98.00. I have seen tripods for sale in well-used condition at pawnshops over the years; most of those were not sold separately from another surveying instrument, and the prices were not much less than for a new tripod. In any case, that hole in the top of the tripod with whatever attachment mechanism that you use is a good point to attach asling for your equipment battery to stabilize the whole setup with antenna from being blown over by the wind. 73,
Lloyd Crawford, N5GDBSecretary-TreasurerRoadrunners Microwave Groupn5gdb@austin.rr.com

Hiya, Very large stick-on Mylar protractors are available from:http://www.oregonruleco.com look under "Dials". Stick'em on your own aluminum disk and you're ready to go.....73 Chip N6CA

True, but its a LOT easier to look up Oregon Ruler Co.<http://www.oregonruleco.com/>. Metal, plastic, left-hand, right hand, etc. Look for "Dials", as well as "protractors." An 8" diameter on is $10.00Also, a good office supply store will have a selection of full-circle protractors, up to 6" or may be 8". Or they can order one for you.
Good luck.73 DonnWA2VOI/0

Hi Gene, I made my own compass rose (protractor) using AutoCAD. It's glued to an aluminum ring that can rotate around the fixed vertical shaft of a simple photographic tripod, and a setscrew locks it in place once I've identified true north. A sheet metal pointer to the compass rose is mounted to azimuth mount for my 19" 10 GHz dish.
I understand that large protractors are available commercially from most drafting supply vendors.
73 de Mike W5VSI

"**Wants and Gots for sale.**

For Sale: 30W 1296 amplifier kit. Cost $45, plus $5 if sent by mail to cover cost of shipping and packaging. In So Cal, can arrange for pickup. Email 1296Amp@cox.net for more info. Chris Shoaff n9rin
Want microwave frequency counter Juno Suh KG6MQS 626-333-3256

2006 10 GHz and Up contest results

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W9FZ 10G 0 121505
WA2VOI 10G 0 120842
WB0LJC UP 0 114097
N0NAS 10G 0 113252
KC0IYT 10G 0 97743
N0UK 10G 0 89534
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W0ZQ UP 0 69273
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WB0VHF 10G 0 66291
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KC0P 10G 0 49390
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KD0JI 10G 0 38770
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KB8VAO UP 6 37526
N0HZO 10G 0 33959
W1MKY 10G 1 32771
KJ6HZ 10G 6 32035
W6DQ UP 6 30818
N0UGY UP 0 30087
W1AUV 10G 1 29865
W1GHZ UP 1 28229
N0IO UP 0 27902
WA6MEM 10G 6 26537
NS1O 10G 1 26427
W1FKF UP 9 25218
WB6DJI 10G 6 24971
K1TEO 10G 1 23508
KK6MK 10G 6 22785
K6GZA UP 6 22019
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K2KIB 10G 2 21525
K0KFC 10G 0 20694
KA1OJ UP 1 19243
N2UO 10G 2 18660
W6HCC UP 0 18434
KC0LEF UP 0 18252
K1WHS UP 1 16862
W6BY UP 6 16235
KA1ZD 10G 1 16052
N6DN 10G 6 14655
KM0T 10G 0 14487
W3HMS 10G 3 14231
W6OYJ 10G 6 14096
K0RZ UP 0 12500
N1FOJ 10G 1 12354
WA3PTV 10G 3 12295
WB5PJB 10G 0 12066
K1LPS 10G 1 11907
WA1MBA UP 1 11361
K1DS UP 3 10763
VE3SMA UP 15 9591
W1VT 10G 1 9321
VE3NPB 10G 15 9080
K5RHR UP 0 8751

KE5HHU UP 0 8006
AA2WV 10G 2 7934
K6WCI 10G 6 7777
WB0WNV UP 0 7718
W1JHR 10G 1 7650
VE3TFU 10G 15 7576
W2DYY UP 2 7419
K1RZ 10G 3 7256
N6IZW UP 6 7232
AA6HA 10G 6 7143
N2CQM 10G 2 7023
WB8TGY UP 8 6935
K1ZE 10G 1 6892
N9RIN 10G 6 5956
W9SZ 10G 9 5942
WA8VPO UP 8 5903
K6HLH 10G 6 5820
VE3FN 10G 15 5673
K2YAZ UP 8 5445
VE3RKS UP 15 4340
WB6DNX 10G 6 3978
K3SIW UP 9 3733
W6ASL 10G 6 3605
W5UWB 10G 5 3350
K1TR 10G 1 3015
W1RIL UP 1 2973
KB0MRK 10G 0 2959
WA8RJF 10G 8 2758
WB9SNR 10G 9 2403
K8WW 10G 8 2327
AA9IL UP 9 2267
WA6QYR 10G 6 2251
W0PHD 10G 0 1206
WA5YWC 10G 5 1135
WA5TKU 10G 5 1085
KA5BOU 10G 5 952
K7RJ UP 7 568
N8KH 10G 4 399
VE2PIJ 10G 15 340
K8DOG 10G 8 212
KI5WL 10G 7 109
KD0IF UP 6 107

Japan's CQ magazine in 2006 has an article on the OVRO EME adventures.

The **San Bernardino Microwave Society** is a technical amateur radio club affiliated with the ARRL having a membership of over 90 amateurs from Hawaii and Alaska to the east coast and beyond. Dues are $15 per year, which includes a badge and monthly newsletter. Your mail label indicates your call followed by when your dues are due. Dues can be sent to the treasurer as listed under the banner on the front page. If you have material you would like in the newsletter please send it to Bill WA6QYR at 247 Rebel Road Ridgecrest, CA 93555, bburns@ridgecrest.ca.us, or phone 760-375-8566. The newsletter is generated about the 15th of the month and put into the mail at least the week prior to the meeting. This is your newsletter. SBMS Newsletter material can be copied as long as SBMS is identified as source.

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